

## Biosensors

### 1. How do you think of biosensor?

#### i. What are the criteria a biosensor should have?

Accuracy and sensitivity

Harm to environment is much less than physical method

#### ii. In what way do you think we need a biosensor?

Environment pollution issue – lead in water, to get immediate response

Medical issue – diagnosis (Renneberg, risk of heart disease)

#### iii. Are there common examples for people (researchers, workers, farmers) using biosensor in monitoring environment?

HKUST – using zebra fish (radioactively labelled the metal) detection –  
detection of heavy metals (Prof WANG Wenxiong)

### 2. In what way do you think a microbial biosensor is necessary? When will it be useful? What are the criteria of making a microbial biosensor? When will you think it is worth a while to use microbial biosensor?

Sensitivity (low concentration), accuracy (interference), production cost, safety

## Microbial biosensors

### 3. How do you think of using microbial biosensor in soil? Will it be better than physical/ chemical means?

We need to think about its sensitivity and accuracy. Chemical tests will usually cause interference because some similar chemicals will produce same chemical reactions

Does the result 100% comes from the target molecules?

Biosensor is biological so it maybe more accurate than chemical means. Biosensor can detect small or large concentration of target molecules.

Will chemical production be more expensive than biological production?

### 4. Do you think an iGEM project using GMO for detection of NPK, regardless of the medium, is a good idea?

#### i. In comparison with physical and chemical methods, will it look meaningless?

The biosensor design should be creative; meanwhile comprehensive and practical.

From the perspective of farmers, they may feel scared about bacteria. They will associate them with disease. How do you convince others that your products

Interview Transcript

won't affect the health of plants and human beings? Will people have negative impression that will affect farmers' business if bio-sensing methods are applied during farming?

In poor farmers' point of view, the cost for soil tests could be unaffordable! If the cost of bio-sensing methods is more expensive than the existing chemical or physical methods, why do the farmers need to use bio-sensing methods?  
I don't think response rate is of utmost importance in farming.

**Past iGEM Projects**

**5. Can you suggest some past projects that do well in biosensing?**

I was impressed by the Killing Bee iGEM project because Bee farms are engaged in this iGEM project. They did a good job in biosafety engineering by killing targeted groups of bees.

Another example is about light-sensitive GM bacteria. When it is exposed to the environment, the light-sensitive GM bacteria will undergo self-killing under sunlight.

**6. Can you suggest some past projects that need further improvements? [Optional question]**

They focused too much on the usage of their products in a particular working environment, but seldom concerned other environmental factors. They need to show they have foreseen or thought of other challenges when their device was applied into different environments even though they cannot tackle the related problems.

**Risk and Regulations**

**7. Is using genetically-modified-organism (bacteria)-containing machine to test for concentration in field an inappropriate practice, in terms of safety? Why?**

It depends on your design. We pay attention to the risk group your device belongs to. If it belongs to risk level one, it's safe. If it belongs to risk level two, I need to know how you control the organism. Will the risk increase if you release it to the environment? What are the environmental factors that will make the organisms mutated? If it is mutated, what will you do to shut it down?

**8. Do you think the microbial biosensor will be a threat to safety? How risk assessments shall be done?**

I don't think it threatens from the perspective of my profession. I will look at factual information. Your information release. Is it transparent enough? Your scientific data. I will base on your information to convince me whether I should use or not.

**9. If the risk of using the GMO sensor overtakes its practicality, do you think it is a successful project?**

Not good. People should not continue the project. Risk should be the first and

foremost problem they need to concern from my perspective of my profession.

**10. What should the measures be undertaken to prevent safety problems?**

First, you should look at your design. Is there any possibility for your device to interact with the environment? What is the level of harm towards public health. How does it cause the harm?

**11. How far do you know about our government regulates the in-field use of GMO? And the use of GMO, which is stored in a device?**

Different countries have different regulations towards contained use of GMO. It may require specific case-by-case approval. There is no general regulation. But I seldom heard of regulations on in-field use of GMO.

**12. If the product of our project can only be used in the lab, do you think it is successful?**

Yes, of course. Every marvelous invention starts from laboratory. Even though it cannot be carried out in field, it can still be beneficial to the human beings.